NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

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February 26, 1987

Project Officer
Ground-Water Classification Guidelines
Office Of Ground-Water Protection
U.S. Environmental Protection Agency
401 M Street SW (WH-550G)
Washington, DC 20460

Dear Sir:

Enclosed please find New Mexico Environmental Improvement Division comments on the November 1986 final draft of "Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy". These comments were circulated in draft form to the members of the New Mexico Water Quality Control Commission, and many suggestions from commissioners have been included in this submission.

We appreciate EPA efforts to incorporate ideas from the states and the public in its decision-making process. It is essential for the development of programs that will be workable in the differing states that these efforts be continued and expanded. In particular, EPA should solicit substantial input from the states and the public in developing procedures for implementing these guidelines in specific programs and situations. EPA should also be flexible in determining whether a state system is "at least as stringent" as or "equivalent" to EPA's, and allow substitution of a state system for EPA's wherever possible. Equivalency should be judged by the results in protecting ground water, not by whether the details of a state's program are identical with federal guidelines which may or may not be suitable to that state's climate and geology.

Thank you for your attention to these comments.

Sincerely,

Michael J. Burkhart, Director
Environmental Improvement Division

MJB:MSG:dlr

Enclosure

cc: Members of the New Mexico Water Quality Control Commission
Dr. Kirkland Jones, Assistant Director, EID

EQL

WCO
Exhibit #7

Comments on Final Draft dated November 1986
of
'Guidelines for Ground-Water Classification Under the EPA Ground-Water Protection Strategy'

Comments Submitted by

New Mexico Environmental Improvement Division

February 1987

The opportunity to submit comments to the U.S. Environmental Protection Agency on these draft guidelines before final decisions are made on various options is appreciated. It is apparent that a great deal of thought and effort has gone into developing and explaining the different alternatives presented. It is also apparent that these guidelines are likely to have a significant effect on EPA programs and related state programs, making the opportunity to comment particularly important in this case.

The following comments fall into five categories: general comments; comparison with New Mexico Water Quality Control Commission classification system; topics which EPA highlighted for comment; other substantive topics; and editorial comments, including apparent typographical errors.

I. General Comments

It is stated in the introduction to these draft guidelines (p.3) that they stem from the need to achieve greater consistency in the various programs at EPA with ground water protection responsibilities. It is further stated that in order to implement these classification guidelines, EPA programs will need to modify their specific guidance documents and regulations (p.6). Consistency among programs is an important goal; how close regulators come to achieving it will depend both on the content of these guidelines and on how they are incorporated and used in the various EPA programs. One of the difficulties in commenting on the proposed guideline is the fact that it is unknown at this time how they will be used in EPA programs.

EPA has said clearly that states will not be required to adopt the EPA classification system or another system for general state ground water program use. However state agencies implementing delegated EPA programs will need to use these guidelines as appropriate to those programs (p.10), with the possibility of substituting state classification systems under certain circumstances (p.14). Of course, the states will certainly be affected by EPA use of the guidelines in implementation of EPA programs in the states.

In light of all these circumstances, it is crucial to the long range success of the guidelines in protection of ground water quality that EPA continue and expand its efforts to make the programs workable in the various states with widely differing geology and climate. EPA not only should seek state input into the guideline development process, which it has been doing, but also should do the following:

1. Substantial input from the states and the public should be solicited by EPA as its programs develop procedures for implementing these guidelines in specific situations.

2. EPA should definitely substitute state classification systems for the EPA system wherever possible, as is suggested on page 14 might be done. What approach the Agency takes toward determining whether state systems are "at least as stringent" as or "equivalent" to the Agency's will be crucial to the states' reaction to the Agency's classification system. It is extremely important to recognize that ground water characteristics and problems depend strongly on site-specific conditions, which differ within and among the states. Federal authorities must be flexible in judging whether a state program is "equivalent" to the Federal minimum. Equivalency should be judged by the results in protecting ground water, not by whether the details of the state's program are identical with Federal guidelines which may or may not be suitable to that state's climate and geology. It can cause disruption of successful state programs and consequent damage to ground water if EPA is not flexible in the approach it develops to judging equivalency.

II. Comparison with New Mexico WQCC Classification System

The regulations to protect ground water quality adopted by the New Mexico Water Quality Control Commission in 1977 established a ground water classification system having two classes:

A. Protected under the regulations for present and potential future use as domestic and agricultural water supply is all ground water having a concentration of 10,000 mg/l or less total dissolved solids (TDS). Also protected are those segments of surface waters which are gaining because of ground water inflow, for uses designated in the New Mexico Water Quality Standards for Interstate and Intrastate Streams.

B. Not protected under the New Mexico regulations are any ground waters with a TDS concentration exceeding 10,000 mg/l, except insofar as they may impact other waters of better quality.

The New Mexico classification system has similarities to and differences from the proposed EPA classification guidelines.

Similarities:

1. Both classification systems make a distinction between ground water having present or potential future use, and ground water not considered to have potential for future use, and give lesser protection to that water not considered a potential water supply.

2. Both systems place ground water with a TDS exceeding 10,000 mg/l in the category of water not considered to be a potential water supply and therefore receiving less protection.

3. Both systems assume that ground water not in present use is potentially usable unless demonstrated otherwise.

4. Although it is phrased differently in the two systems, both classify aquifers with relatively low yields as potential sources of water, thus recognizing the fact that enough water to supply a single rural family can be a valuable resource. WQCC defines "ground water" (which is eligible for protection) as interstitial water which is "capable of entering a well in sufficient amounts to be utilized as a water supply". There is no minimum number of people it must be capable of supplying. EPA's sufficient yield criterion is 150 gallons-per-day which EPA considers to be the yield below which it is impactical to support basic household needs (p.45). Thus the state and EPA both protect ground water in quantities to supply a single household, and the state also protects lesser usable amounts such as ten gallons-per-day for a cabin.

5. Both systems take into account the interconnection between surface water and ground water, and the situation where ground water discharges into a surface water system.

Differences:

1. The WQCC system has two classes: that ground water which is protected for present or potential future use, and that which is not considered to have potential for future use and is not so protected. The EPA system has three classes: special ground waters which are to receive extraordinary protection, designated Class I; current and potential sources of drinking water, designated Class II; and ground waters not considered potential sources of drinking water, designated Class III. The WQCC class which has its quality protected for present and future use corresponds to both EPA Classes I and II. Basic to the EPA Class I determination is the idea that "extraordinary protection" may be needed where ground water is "highly vulnerable". This concept of extra protection for vulnerable areas is built into the WQCC regulations, since the discharger must demonstrate that his discharge will not cause standards to be violated in ground water; the more vulnerable the ground water the greater the protection that must be provided to make this demonstration. The "ecologically vital" criterion of EPA Class I corresponds in the WQCC system to the regulatory requirement that Stream Standards not be violated. The Stream Standards specify, for each stream segment, designated uses to be protected, and provide extra protection for sensitive areas through the antidegradation policy. The WQCC class which does not have its quality protected corresponds to EPA Class III.

2. The WQCC system classifies ground water in usable quantities solely on the basis of whether its TDS concentration is greater or less than 10,000 mg/l. The EPA system uses several other criteria in addition to that one. Ground waters can be placed in Class III not only if their TDS concentrations exceed 10,000 mg/l, but also if they are so contaminated that they "cannot be cleaned up using treatment methods reasonably employed in public water-supply systems." Class I designation depends on such concepts as vulnerability, irreplaceability, substantial population, economic infeasibility, etc.

3. The WQCC system states that ground water is to be protected for present or future domestic and agricultural use. The EPA system protects for present or potential drinking water supply, and assumes that other beneficial uses will be protected if the water is protected for drinking purposes.

4. The WQCC system gives the same protection to present and potential future uses of ground water. In the EPA system a distinction is made between Class II A (present use) and Class II B (potential future use). The practical effects of this distinction will not be known until the various EPA programs amend their regulations to incorporate this classification system.

The WQCC system has been in use in New Mexico for ten years, since 1977. Experience has shown that this relatively clear and easily understood system is very effective in protecting ground water quality in the state.

III. Topics Highlighted by EPA for Comment

A. Class III Ground Waters Untreatability Test

EPA's 1984 Ground-Water Protection Strategy places in Class III those waters which are not potential sources of drinking water due to contamination by naturally occurring conditions, or by the effects of broad-scale human activity (unrelated to a specific activity), which cannot be cleaned up using treatment methods reasonably employed in public water-supply systems. These guidelines present two alternative tests for making the determination that ground water is "untreatable": the treatment technology test and the economically based test. The guidelines explain (p.43) that the focus on public water system technologies (rather than all technologies) was established in the Strategy in 1984. However, the economically based test described in Appendix G would be a substantial departure from the Strategy.

Economically based test: There are a number of serious objections to the economically based test, objections to the method in general and also to the cutoffs proposed if the method were to be used. It appears to make many ground waters candidates for Class III, which would be in conflict with the statement on page 4 that the extremes of the classification system (Class I and Class III) should be restricted to rather infrequent situations. In a water-short state like New Mexico, it is important that the lesser protection that may be given to Class III waters only apply to those waters which are truly "untreatable". Another problem is that this economically based test is presented in a confusing manner, with statements appearing to contradict each other, which may indicate that it has not been well thought out.

It seems that what Appendix G proposes is a quick way for non-economists to do an analysis on an aquifer for purposes of classification. Some cases will be clear enough that the classification will be this simple. However, the potential cost of a wrong classification to either Class I or Class III are so high that it seems pennywise and pound foolish to avoid the demand analysis for any case which is not clear cut. Particular objection must be raised to the use of the Class III threshold income tests. The 0.3 percent

threshold test for water cost for Class III water, given average 1984 New Mexico household incomes on page G-16, would be $5.55 per month. This value is supposed to indicate that the water is particularly costly to treat and use as a source of drinking water. The second threshold step uses treatment costs when they increase to $300 per year (or $25 per month) or when they double water costs. Water costs for municipalities in New Mexico frequently rise to this level. The New Mexico Public Service Commission 42nd Annual Report (July 1, 1985-June 30, 1986) reports that for regulated utilities in 1985 the average annual residential bill per household was $254.32 for an average use of 105,000 gallons per year. The average usage and average annual bill were higher for non-residential customers. In the Bureau of Reclamation's public hearings considering whether to build Conner Dam many citizens of Silver City lobbied hard for a water source which would have been likely to more than triple their own water bills. This would suggest that the threshold tests for Class III Water are probably far too lenient.

One must assume that income is being used here as a proxy for demand since income is a major determinant in the demand for water and for water quality. The fundamental error in this is that it is net benefits which should be considered.

Benefits will depend on the legal definition of the water right. If the right to a given quality of water is vested with the user or potential user then the value which should be considered is the willingness to sell, permanently, the right to that level of quality on the part of the water user. If the right to water and water quality is not vested with the user then the benefit value which should be considered is expected willingness to pay for all uses over time. The willingness to pay should include option value and preservation value as well as expected use value. These benefits should be compared to the incremental difference in the cost of protecting the aquifer at the next higher level class being considered. These should be discounted over time using a Social Discount Rate (an interest rate reflecting societies' time preferences with respect to amenity values such as water quality).

While drinking water is far more valuable than industrial or agricultural water it is not the only valuable water. In some cases water can be treated and used more than once. Millions of dollars are expended each year on research regarding arid land agriculture using saline water. As genetically engineered seed is developed which can use this water the water may become an economic resource. In addition, technology for cleaning water with high levels of total dissolved solids (TDS) has improved over time. Because of the high likelihood of changes in the value of ground water it would be a good idea to consider not only the value of water for drinking but also for other potential secondary future uses as well as the potential for further reductions in the cost of cleaning high TDS water.

Among the confusing and apparently contradictory statements are those on pages G-4 and G-5 where the test of $300 or 100% increase in household water rates appears to apply only to an increase due to additional treatment costs, as compared with the statement on page G-20 which refers to increasing total system costs to a level above $300 per household per year, or an increase of 100% over current rates. Also, it is

not clear whether it is intended that the more lenient or the more stringent of the two criteria is to be met to meet the test for Class III designation.

On different pages, different figures are given for typical household water use. On page G-7 the calculation of typical water supply costs assumes average annual household usage of 60,000 gallons. On page E-15 the calculations are based on average household usage of 100,000 gallons per annum (which agrees well with the New Mexico Public Service Commission figure of 105,000 gallons per annum quoted above). On page G-14 average annual household usage is given as 150,000 gallons, along with the statement that this includes some other unspecified uses. It is not explained why these widely differing usage figures, giving very different results for water costs, are used for "average" water use. In contrast, there is extensive justification given on page 45 for the minimum household usage of 150 gallons per day (or 54,750 gallons per year) below which EPA considers it impractical to support basic household needs.

There are several places in Appendix G where statements seem to be backwards: In the first paragraph on page G-2, is the sentence "The social costs of protection result from the loss of the economic and other benefits of using the resource." If the resource referred to is ground water, then shouldn't the sentence start out "The social costs of lack of protection ..."? On the last line of page G-2 is "Class I" meant instead of "Class III"? In the first full paragraph on page G-5, shouldn't the same class be referred to in the first and third lines, either Class I both places, or Class III both places?

Treatment technology test: The treatment technology test which is explained starting on page 115, is much better than the economically based test discuss above. However, improvements still could be made. In order that ground water that may be usable in the future not be allowed to be degraded, it is important that only those waters which it is truly impractical to treat be placed in Class III. Therefore, the list of treatment technologies that might be used should include more technologies than it presently does, and it should be specifically stated that additions will be made to the list as new technologies are developed. Technologies in common use in industry and in aquifer reclamation but not yet in common use in water treatment plants should certainly be included. This would be a slight departure from the phrasing in the 1984 Strategy, but the departure would be much less than the proposed economically-based test would be.

The intent of including in Class III waters those waters which "cannot be cleaned up using treatment methods reasonably employed in public water systems" is elusive. Carbon adsorption and air stripping (the most common aquifer reclamation technologies used in New Mexico) are not used in New Mexico water supply systems, yet they are considered "reasonably employed." Biological treatment is becoming an effective technology in aquifer reclamation, yet is generally impractical for use in water supply plants. Is the intent truly to restrict applicable technologies to those commonly used in each region's public water supply systems (p.120) and relegate waters that may reasonably be cleaned up by other technologies to Class III?

Waters contaminated by "broad scale human activity" which are refractory to treatment methods reasonably used in public water supply systems are relegated to Class III. Aquifers contaminated by multiple sources in urbanized industrial areas are apparently included (p.80), yet New Mexico's number one priority Superfund site is just such an area. Would non-point source contamination, such as nitrate pollution by subdivision septic tanks be included? Further explanation of the meaning of "broad-scale human activity" is in order.

B. Class I Ground Waters Tests

For reasons of clarity of requirements, defensibility and enforceability, New Mexico prefers objective and numerically based standards and requirements where these can be developed. While such standards and requirements can be applied equitably in most instances, broadening ranges of applicability of inflexible standards can result in decreasing equitability. In general, New Mexico favors "Option A" over "Option B" for each of the three options offered. However given broad differences in the resource and social environment between New Mexico and areas of the country outside the Southwest, we believe that classifications of ground water based on criteria intermediate to options A and B would be more appropriate than either system alone. Because of these vast differences in context throughout the country, EPA may wish to allow each state to offer for approval its own definition of and numerical criteria for the several terms under discussion, for use by EPA and the state in that state's particular environment.

Substantial Population: New Mexico supports well-defined criteria, but questions the uniform applicability of a criterion such as equal to or greater than 2500 people or a density of 1000 people per square mile. Density differences between New Mexico and the East Coast illustrate the difficulty of fairly applying a common single numerical criterion. EPA should consider the option of allowing each state to propose its own quantifiable standard. The alleged disadvantage of "inconsistencies between states" is simply a reflection of actual differences in circumstances and needs.

Economic Infeasibility: In general, it appears that it must be expensive to replace a water supply source for an aquifer to be considered Class I (0.7% of household income), and yet Appendix G proposes that to be classified as Class III is possible when it is relatively cheap to provide an alternate water supply. The inequality of these tests is not adequately explained and does not appear to be justifiable. Additionally, it is emphasized in several places that the economic test is a test only, and that users are not actually expected to pay. Why, then, does Option B on p. 36 refer to a community's "willingness" to pay as a possible criterion of economic infeasibility? Many of the difficulties with Appendix G as discussed above under Class III apply also to Class I. Appendix G is, in general, rather confusing, and the discussion in Appendix E starting on p. E-15 is particularly so.

Vulnerability: As explained earlier, the concept of vulnerability is already built into the New Mexico regulatory system since the burden of proof is on the discharger to demonstrate that his activities will not cause ground water standards to be violated. For use in the EPA system there is always the question: vulnerable to what? In most cases vulnerability to a pesticide application would be different from vulnerability to a surface impoundment or an injection well. However, in general, New Mexico supports the use of the DRASTIC model for vulnerability and the concept of using a different cutoff for more arid areas. However, EPA may wish to develop and apply a screening test to identify those areas obviously vulnerable. Areas such as some with less than fifty feet to ground water or with karst terrain should automatically be considered as "highly vulnerable".

IV. Other Substantive Topics

A. Ecologically Vital

The discussion of "ecologically vital ground water" on page 37 confines this Class I ground water to a ground-water discharge supporting a habitat for a nationally endangered or threatened species (listed or proposed) and discharges on federal land management areas, Congressionally designated and managed for the purpose of environmental protection. This definition is too narrow and should be expanded. It would not, for instance, cover La Joya State Wildlife refuge where ground water inflow is vital to maintain the wetland habitat. In general, state wildlife refuges, areas supporting state-listed endangered or threatened species, and areas managed by states and such organizations as the Nature Conservancy for ecological protection and conservation need to be considered for Class I ground water protection.

Case study 8 (pp. C-59 through C-65) raises serious issues. The whole scheme is used very logically to arrive at a classification of Class II-B for the area where a facility is to be located. When it is considered that the whole river is bordered by wetlands and that an endangered species habitat is found on the downstream subdivision as well as the cross-stream subdivision, it appears rather that ecological considerations should indicate a Class I classification. The classification review scheme, as presented, gives no consideration to the possible expansion of the endangered species habitat, the need for an ecological buffer zone, the value and use of the wetlands bordering the river, or possible effects of upstream ground water inflow on the quality of the water being received by the downstream endangered species habitat.

B. Current and Potential Sources of Drinking Water

New Mexico, as a state with many rural water users, protects ground water quality for persons on individual wells as well as for those connected to public water supplies. EPA is to be commended for also recognizing the value of rural water supplies by its positions that (1) ground water is a current source of drinking water if there is one operating drinking-water well in the Classification Review Area; and (2)

ground water meets the sufficient yield criterion for a potential source of drinking water if there is yield sufficient for a single household.

C. Subdivision of the Classification Review Area

Various types of boundaries that might apply when subdivision of the Classification Review Area is being considered are discussed starting on page 59. It should be emphasized that in many cases, such as cases of complex alluvial stratigraphy, these boundaries cannot be well defined and may not give good separation between units. In those cases where it is not clearly justified, the CRA should not be subdivided into separate units.

D. Ground Water with TDS over 10,000 mgl

In EPA's classification document, there is no recognition that ground waters with total dissolved solids contents of over 10,000 mg/l total dissolved solids, though not used for drinking water, may warrant protection because of the beneficial uses of these waters. The New Mexico classification system similarly does not protect ground water with a TDS over 10,000 mg/l. This is a practical and workable cutoff in most cases. However, sometime in the future it may be advisable to adjust this cutoff to make provision for exceptions in unusual circumstances. To amplify, the New Mexico Solar Energy Institute at New Mexico State University is currently using saline ground water with a total dissolved solids content of 14,000 mg/l in an aquaculture study at the Roswell Test Facility in Roswell. The current project is "Optimization of the Pilot-Scale Cultivation of Commercially Valuable Oysters in New Mexico's Saline Groundwaters". Several species of marine phytoplankton have been shown to grow in these saline waters and one has been grown to pilot scale. This activity requires uncontaminated saline ground water.

V. Editorial Comments and Apparent Typographical Errors.

A. Conservation Foundation, 1985 referenced on both pages 10 and 15 is not included in the reference list beginning on page 135. The organization putting forth the recommendations in the referenced document is the National Ground-Water Policy Forum (rather than Form) as indicated on page 15.

B. The reference on page 54 should be to Clean (not Clear) Water Act Section 208 studies.

C. It would be very helpful to the reader to add "beneficial uses" to the glossary. This term, which is rather vague, is addressed on page 15 but it would be helpful to have it in the glossary also.

D. On page 86, Unit 1 appears to be Class I, but that is not stated on the figure.

E. On page 56 various regions are referred to, and it would be very helpful to have a map to identify these regions.

F. Table 4-6 on page 114 appears to be identical to Table B-1 on page B-10.

G. On page B-14 is the sentence "The multiple well option is an expansion of the "one-well" option that is highlighted for public comment." The context makes it appear that "not highlighted" is what was meant.

H. In Table C-1 on page C-3, if the heading "treatability" were replaced by "untreatable" that would correspond more closely with the concepts in the text.

I. Unit 1 is listed as Class II B in Figure C5-3 on page C-34, but in the text on page C-40 it is designated Class II A.

J. The figures on pages C-81 to C-83 are not clear as to where the ecologically vital area is; the different figures appear contradictory.

K. On page E-15 there appear to be many inconsistencies in the numbers presented; it would appear that there may be errors in the decimal places of some.

L. On page E-19, 3rd sentence: "air; water ratio" should be air/water ratio".

M. On pages G-2 and G-5 there appear to be inconsistencies in the use of Class I" and "Class III" in several statements.